

SEQUENCE LISTING

<110> Lei, Xingen
Mullaney, Edward J
Ullah, Abul H.J.

<120> USING MUTATIONS TO IMPROVE ASPERGILLUS PHYTASES

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<150> 60/410,736

<151> 2002-09-13

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<170> PatentIn Ver. 2.1

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<213> Aspergillus niger

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
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Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
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Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285
Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Lys	Lys	Tyr	Tyr	Gly	290	295	300
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315
Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr	325	330	335
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Gln Tyr Ser Pro Phe Phe Ser Leu Glu Asp Glu Leu Ser Val Ser Ser
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Lys Leu Pro Lys Asp Cys Arg Ile Thr Leu Val Gln Val Leu Ser Arg
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His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Lys Tyr Lys Lys
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Leu Val Thr Ala Ile Gln Ala Asn Ala Thr Asp Phe Lys Gly Lys Phe
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Pro Phe Gly Glu Gln Gln Leu Val Asn Ser Gly Ile Lys Phe Tyr Gln
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<213> *Aspergillus niger*

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<213> *Aspergillus niger*

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
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Gly Pro Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
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Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
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 <212> DNA
 <213> Aspergillus niger

<400> 7

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<211> 467

<212> PRT

<213> *Aspergillus niger*

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Thr	Val	Asp	Gln	Gly	Tyr	Gln	Cys	Phe	Ser	Glu	Thr	Ser	His	Leu	Trp
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Gly	Gln	Tyr	Ala	Pro	Phe	Phe	Ser	Leu	Ala	Asn	Glu	Ser	Val	Ile	Ser
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Pro	Glu	Val	Pro	Ala	Gly	Cys	Arg	Val	Thr	Phe	Ala	Gln	Val	Leu	Ser
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Arg	His	Gly	Ala	Arg	Tyr	Pro	Thr	Asp	Ser	Lys	Gly	Lys	Lys	Tyr	Ser
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Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys
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Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu
				245					250					255	
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				325					330					335	
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn
			340					345					350		
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 Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415
 Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430
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 Cys Phe Ala
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<210> 9

<211> 1455

<212> DNA

<213> *Aspergillus fumigatus*

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<210> 10

<211> 465

<212> PRT

<213> *Aspergillus fumigatus*

<400> 10

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			20					25					30		

Val	Asp	Leu	Gly	Tyr	Gln	Cys	Ser	Pro	Ala	Thr	Ser	His	Leu	Trp	Gly
	35						40					45			

Gln	Tyr	Ser	Pro	Phe	Phe	Ser	Leu	Glu	Asp	Glu	Leu	Ser	Val	Ser	Ser
	50					55					60				

Lys	Leu	Pro	Lys	Asp	Cys	Arg	Ile	Thr	Leu	Val	Gln	Val	Leu	Ser	Arg
65				70					75						80

His	Gly	Ala	Arg	Tyr	Pro	Thr	Ser	Ser	Lys	Ser	Lys	Lys	Tyr	Lys	Lys
			85						90					95	

Leu	Val	Thr	Ala	Ile	Gln	Ala	Asn	Ala	Thr	Asp	Phe	Lys	Gly	Lys	Phe
			100					105					110		

Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Thr	Leu	Gly	Ala	Asp	Asp	Leu	Thr
			115				120					125			

Pro	Phe	Gly	Glu	Gln	Gln	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr	Gln
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Arg	Tyr	Lys	Ala	Leu	Ala	Arg	Ser	Val	Val	Pro	Phe	Ile	Arg	Ala	Ser
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Gly	Ser	Asp	Arg	Val	Ile	Ala	Ser	Gly	Glu	Lys	Phe	Ile	Glu	Gly	Phe
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Gln Gln Ala Lys Leu Ala Asp Pro Gly Ala Thr Asn Arg Ala Ala Pro
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 195 200 205

Asp His Gly Val Cys Thr Lys Phe Glu Ala Ser Gln Leu Gly Asp Glu
 210 215 220

Val Ala Ala Asn Phe Thr Ala Leu Phe Ala Pro Asp Ile Arg Ala Arg
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Ala Glu Lys His Leu Pro Gly Val Thr Leu Thr Asp Glu Asp Val Val
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Ser Leu Met Asp Met Cys Ser Phe Asp Thr Val Ala Arg Thr Ser Asp
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Ala Ser Gln Leu Ser Pro Phe Cys Gln Leu Phe Thr His Asn Glu Trp
 275 280 285

Lys Lys Tyr Asn Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly Tyr Gly
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Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Ile Gly Phe Thr Asn Glu
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Leu Ile Ala Arg Leu Thr Arg Ser Pro Val Gln Asp His Thr Ser Thr
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Asn Ser Thr Leu Val Ser Asn Pro Ala Thr Phe Pro Leu Asn Ala Thr
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Met Tyr Val Asp Phe Ser His Asp Asn Ser Leu Val Ser Ile Phe Phe
 355 360 365

Ala Leu Gly Leu Tyr Asn Gly Thr Glu Pro Leu Ser Arg Thr Ser Val
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Glu Ser Ala Lys Glu Leu Asp Gly Tyr Ser Ala Ser Trp Val Val Pro
 385 390 395 400

Phe Gly Ala Arg Ala Tyr Phe Glu Thr Met Gln Cys Lys Ser Glu Lys
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Glu Pro Leu Val Arg Ala Leu Ile Asn Asp Arg Val Val Pro Leu His
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Lys Gly Leu Ser Trp Ala Arg Ser Gly Gly Asn Trp Gly Glu Cys Phe
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Ser
465

<210> 11
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<213> *Aspergillus niger*

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<210> 12

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 12

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			20					25					30		

Thr	Val	Asp	Gln	Gly	Tyr	Gln	Cys	Phe	Ser	Glu	Thr	Ser	His	Leu	Trp
		35					40					45			

Gly	Leu	Tyr	Ala	Pro	Phe	Phe	Ser	Leu	Ala	Asn	Glu	Ser	Val	Ile	Ser
	50					55					60				

Pro	Glu	Val	Pro	Ala	Gly	Cys	Arg	Val	Thr	Phe	Ala	Gln	Val	Leu	Ser
65					70					75				80	

Arg	His	Gly	Ala	Arg	Tyr	Pro	Thr	Asp	Ser	Lys	Gly	Lys	Lys	Tyr	Ser
			85					90						95	

Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys
		100					105						110		

Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu
	115						120					125			

Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr
	130					135						140			

Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	
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Ser	Gly	Ser	Ser	Arg	Val	Ile	Ala	Ser	Gly	Lys	Lys	Phe	Ile	Glu	Gly	
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Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser	
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Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn	
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Asp	Thr	Val	Glu	Ala	Asn	Phe	Thr	Ala	Thr	Phe	Val	Pro	Ser	Ile	Arg	
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Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn	
			340					345					350			
Ser	Thr	Leu	Tyr	Ala	Asp	Phe	Ser	His	Asp	Asn	Gly	Ile	Ile	Ser	Ile	
		355					360					365				
Leu	Phe	Ala	Leu	Gly	Leu	Tyr	Asn	Gly	Thr	Lys	Pro	Leu	Ser	Thr	Thr	
	370					375					380					
Thr	Val	Glu	Asn	Ile	Thr	Gln	Thr	Asp	Gly	Phe	Ser	Ser	Ala	Trp	Thr	
385				390						395					400	

Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
435 440 445

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
450 455 460

Cys Phe Ala
465

<210> 13
<211> 1401
<212> DNA
<213> *Aspergillus terreus*

<400> 13
atggggggttt tcgtcgttct attatctatc gcgactctgt tcggcagcac atcgggcact 60
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ttccctgagc tctcccataa atgggggtctc tacgcgcctt atttctccct ccaggatgaa 180
tctccgtttc ctctggacgt cccggatgac tgccacatca cctttgtgca ggtgctggcc 240
cgacatggag cgcggtctcc aaccgatagc aagacaaagg cgtatgccgc gactattgca 300
gccatccaga agaatgccac cgcgttgccg ggcaaatacg ccttcctgaa gtcgtacaat 360
tactccatgg gctccgagaa cctgaacccc ttccggcgga accaactgca agatctgggc 420
gcccagttct accgtcgcta cgacaccctc acccggcaca tcaacccttt cgtccggggc 480
gcggattcct cccgcgtcca cgaatcagcc gagaagttcg tcgagggtt ccaaaacgcc 540
cgccaaggcg atcctcacgc caaccctcac cagccgtcgc cgcgcgtgga ttagtcatc 600
cccgaaggca ccgcctacaa caacacgctc gagcacagca tctgcaccgc ctccgaggcc 660
agcaccgtcg gcgacgccgc ggcagacaaac ttactgccc tggttcgcgc gccgatcgcc 720
aagcgtctgg aggcgatct gcccggcgtg cagctgtccg ccgacgacgt ggtcaatctg 780
atggccatgt gtccgttcga gacggtcagc ctgaccgacg acgcgcacac gctgtcgccg 840
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cacgacagta acctggtgtc gatcttctgg gcgctgggtc tgtacaacgg caccaagccc 1140
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gtgccgtttg ccgcccgcgc ctacatcgag atgatgcagt gtcgcgcgga gaagcagccg 1260
ctggtgcgcg tgctggtcaa cgaccgtgtc atgccgtgc acggctgcgc ggtggataat 1320
ctgggcaggt gtaaacggga cgactttgtg gagggactga gctttgcgcg ggcaggaggg 1380
aactgggccc agtgtttctg a 1401

<210> 14

<211> 466

<212> PRT

<213> *Aspergillus terreus*

<400> 14

Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
1 5 10 15

Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn His Ser Asp Cys Thr
20 25 30

Ser Val Asp Arg Gly Tyr Gln Cys Phe Pro Glu Leu Ser His Lys Trp
35 40 45

Gly Leu Tyr Ala Pro Tyr Phe Ser Leu Gln Asp Glu Ser Pro Phe Pro
50 55 60

Leu Asp Val Pro Asp Asp Cys His Ile Thr Phe Val Gln Val Leu Ala
65 70 75 80

Arg His Gly Ala Arg Ser Pro Thr Asp Ser Lys Thr Lys Ala Tyr Ala
85 90 95

Ala Thr Ile Ala Ala Ile Gln Lys Asn Ala Thr Ala Leu Pro Gly Lys
100 105 110

Tyr Ala Phe Leu Lys Ser Tyr Asn Tyr Ser Met Gly Ser Glu Asn Leu
115 120 125

Asn Pro Phe Gly Arg Asn Gln Leu Gln Asp Leu Gly Ala Gln Phe Tyr
130 135 140

Arg Arg Tyr Asp Thr Leu Thr Arg His Ile Asn Pro Phe Val Arg Ala
145 150 155 160

Ala Asp Ser Ser Arg Val His Glu Ser Ala Glu Lys Phe Val Glu Gly
165 170 175

Phe Gln Asn Ala Arg Gln Gly Asp Pro His Ala Asn Pro His Gln Pro
180 185 190

Ser Pro Arg Val Asp Val Val Ile Pro Glu Gly Thr Ala Tyr Asn Asn
195 200 205

Thr Leu Glu His Ser Ile Cys Thr Ala Phe Glu Ala Ser Thr Val Gly
210 215 220

Asp Ala Ala Ala Asp Asn Phe Thr Ala Val Phe Ala Pro Ala Ile Ala
 225 230 235 240

Lys Arg Leu Glu Ala Asp Leu Pro Gly Val Gln Leu Ser Ala Asp Asp
 245 250 255

Val Val Asn Leu Met Ala Met Cys Pro Phe Glu Thr Val Ser Leu Thr
 260 265 270

Asp Asp Ala His Thr Leu Ser Pro Phe Cys Asp Leu Phe Thr Ala Ala
 275 280 285

Glu Trp Thr Gln Tyr Asn Tyr Leu Leu Ser Leu Asp Lys Tyr Tyr Gly
 290 295 300

Tyr Gly Gly Gly Asn Pro Leu Gly Pro Val Gln Gly Val Gly Trp Ala
 305 310 315 320

Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro Val His Asp His Thr
 325 330 335

Cys Val Asn Asn Thr Leu Asp Ala Asn Pro Ala Thr Phe Pro Leu Asn
 340 345 350

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Ser Asn Leu Val Ser Ile
 355 360 365

Phe Trp Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Gln Thr
 370 375 380

Thr Val Glu Asp Ile Thr Arg Thr Asp Gly Tyr Ala Ala Ala Trp Thr
 385 390 395 400

Val Pro Phe Ala Ala Arg Ala Tyr Ile Glu Met Met Gln Cys Arg Ala
 405 410 415

Glu Lys Gln Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Met Pro
 420 425 430

Leu His Gly Cys Ala Val Asp Asn Leu Gly Arg Cys Lys Arg Asp Asp
 435 440 445

Phe Val Glu Gly Leu Ser Phe Ala Arg Ala Gly Gly Asn Trp Ala Glu
 450 455 460

Cys Phe
 465

<210> 15
 <211> 2665
 <212> DNA
 <213> *Aspergillus niger*

<400> 15
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 gttctgttct tatgatttcc ccacgtcctt tcgggctttc ggcacagcaa aatagattgt 180
 ttagcaggta cagaaacaac ttgatgacac atgcatccga gaatcttcag ccgtggaagc 240
 attcatgtag atctttgcta agagaaatga tggcggccca gggcatccag gcaccttttc 300
 caacggggaa cttccgccgt ccacgtgctc tgattcagcc aatcaagacg tcccacggca 360
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 gcctttctct cgagaaagct cctccacttc tcccactaga tatctccgtc cccgtcgact 480
 tcccgtccta ttcggcctcg tccgctgaag atccatccca ccattgcacg tgggccacct 540
 ttgtgagctt ctaacctgaa ctggtagagt atcacacacc atgccaaagg gggatgaagg 600
 gggttatatag gaccgtccgg tccggcgcgga tggccgtagc tgccactcgc tgctgtgcaa 660
 gaaattactt ctcataggca tcatgggcgt ctctgctgtt ctacttcctt tgtatctcct 720
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 agacagcgaa ttggccgata ccgtcgaagc caatttcacc gccacgttcg tcccctccat 1500
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 cctcatggac atgtgctcct tcgacaccat ctccaccagc accgtcgaca ccaagctgtc 1620
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 gaaaaagtat tacggccatg gtgcaggtaa cccgctcggc ccgaccagc gcgtcggcta 1740
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 gacggttccg tttgcttcgc gtttgtagct cgagatgatg cagtgtcagg cggagcagga 2040
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 attgcatatc attagcactt caggtatgta ttatcgaaga tgtatatcga aaggatcaat 2280
 ggtgactgtc actggttatc tgaatatccc tctatactc gccacaacc aatcatcacc 2340
 ctttaaacia tcacactcaa gccacagcgt acaaacgaac aaacgcacaa agaataatctt 2400
 acactcctcc ccaacgcaat accaaccgca attcatcata cctcatataa atacaataca 2460

atacaataca tccatcccta ccctcaagtc caccatcct ataataatc cctacttact 2520
 tactttctccc cctccccctc acccttccca gaactcaccc ccgaagtagt aatagtagta 2580
 gtagaagaag cagacgacct ctccaccaat ctcttcggcc tcttatcccc atacgctaca 2640
 caaaaccccc accccgtag catgc 2665

<210> 16
 <211> 467
 <212> PRT
 <213> *Aspergillus niger*

<400> 16
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 Thr Ser Gly Leu Ala Val Pro Ala Ser Arg Asn Gln Ser Ser Cys Asp
 20 25 30
 Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
 35 40 45
 Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
 50 55 60
 Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
 65 70 75 80
 Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Ala Gly Lys Lys Tyr Ser
 85 90 95
 Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
 100 105 110
 Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
 115 120 125
 Thr Pro Phe Gly Glu Gln Glu Leu Val Asn Ser Gly Ile Lys Phe Tyr
 130 135 140
 Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile Val Pro Phe Ile Arg Ser
 145 150 155 160
 Ser Gly Ser Ser Arg Val Ile Ala Ser Gly Lys Lys Phe Ile Glu Gly
 165 170 175
 Phe Gln Ser Thr Lys Leu Lys Asp Pro Arg Ala Gln Pro Gly Gln Ser
 180 185 190

Ser Pro Lys Ile Asp Val Val Ile Ser Glu Ala Ser Ser Ser Asn Asn		
195	200	205
Thr Leu Asp Pro Gly Thr Cys Thr Val Phe Glu Asp Ser Glu Leu Ala		
210	215	220
Asp Thr Val Glu Ala Asn Phe Thr Ala Thr Phe Val Pro Ser Ile Arg		
225	230	235 240
Gln Arg Leu Glu Asn Asp Leu Ser Gly Val Thr Leu Thr Asp Thr Glu		
	245	250 255
Val Thr Tyr Leu Met Asp Met Cys Ser Phe Asp Thr Ile Ser Thr Ser		
	260	265 270
Thr Val Asp Thr Lys Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp		
	275	280 285
Glu Trp Ile Asn Tyr Asp Tyr Leu Gln Ser Leu Lys Lys Tyr Tyr Gly		
	290	295 300
His Gly Ala Gly Asn Pro Leu Gly Pro Thr Gln Gly Val Gly Tyr Ala		
305	310	315 320
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val His Asp Asp Thr		
	325	330 335
Ser Ser Asn His Thr Leu Asp Ser Ser Pro Ala Thr Phe Pro Leu Asn		
	340	345 350
Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile		
	355	360 365
Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr		
	370	375 380
Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr		
385	390	395 400
Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala		
	405	410 415
Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro		
	420	425 430
Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser		
	435	440 445

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
 450 455 460

Cys Phe Ala
 465

<210> 17
 <211> 2665
 <212> DNA
 <213> *Aspergillus niger*

<400> 17
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 ggctatagac actgccgtta tctgactttt aatgagcgag ggcgatgttc atcattcggc 120
 gttctgttct tatgatttcc ccacgtcctt tcgggctttc ggcacagcaa aatagattgt 180
 ttagcaggta cagaaacaac ttgatgacac atgcatccga gaatcttcag ccgtggaagc 240
 attcatgtag atctttgcta agagaaatga tggcggccca gggcatccag gcaccttttc 300
 caacggggaa ctcccgccgt ccacgtgctc tgattcagcc aatcaagacg tcccacggca 360
 atgctggatc aacgatcaac ttgaatgcaa taaatgaaga tggaactaac accatctgct 420
 gcctttctct cgagaaagct cctccacttc tcccactaga tatctccgtc cccgtcgact 480
 tcccgtccta ttcggcctcg tccgctgaag atccatccca ccattgcacg tgggccacct 540
 ttgtgagctt ctaacctgaa ctggtagagt atcacacacc atgccaaagg gggatgaagg 600
 ggttatatag gaccgtccgg tccggcgcg a tggccgtagc tgccactcgc tgctgtgcaa 660
 gaaattactt ctcataggca tcatgggcgt ctctgctgtt ctacttcctt tgtatctcct 720
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 ctgaagctcg gactgtgtgg gactactgat cgctgactat ctgtgcagag tcacctccgg 840
 actggcagtc cccgcctcga gaaatcaatc cagttgcgat acggtcgatc aggggtatca 900
 atgcttctcc gagacttcgc atctttgggg tcaatacgca ccgttcttct ctctggcaaa 960
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 catttccgag gccagctcat ccaacaacac tctcgacca ggcacctgca ctgtcttcga 1440
 agacagcgaa ttggccgata ccgtcgaagc caatttcacc gccacgttcg tcccctccat 1500
 tcgtcaacgt ctggagaacg acctgtccgg tgtgactctc acagacacag aagtgcacta 1560
 cctcatggac atgtgctcct tcgacaccat ctccaccagc accgtcgaca ccaagctgtc 1620
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 ccacactttg gactcgagcc cggctacctt tccgctcaac tctactctct acgcggactt 1860
 ttgcgatgac aacggcatca tctccattct ctttgcttta ggtctgtaca acggcactaa 1920
 gccgctatct accacgaccg tggagaatat caccagaca gatggattct cgtctgcttg 1980
 gacggttccg tttgcttcgc gtttgtacgt cgagatgatg cagtgtcagg cggagcagga 2040
 gccgctggtc cgtgtcttgg ttaatgatcg cgttgtcccg ctgcatgggt gtccgggttga 2100

tgctttgggg agatgtaccc gggatagctt tgtgaggggg ttgagctttg ctagatctgg 2160
 ggggtgattgg gcggagtgtt ttgcttagct gaattacctt gatgaatggg atgtatcagc 2220
 attgcatatc attagcactt caggtatgta ttatcgaaga tgtatatcga aaggatcaat 2280
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 ctttaaacaa tcacactcaa gccacagcgt acaaacgaac aaacgcacaa agaataatttt 2400
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 atacaatata tccatcccta ccctcaagtc caccatcctt ataataatc cctacttact 2520
 tacttctccc cctccccctc acccttccca gaactcaccc ccgaagtagt aatagtagta 2580
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<210> 18

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 18

Met Gly Val Ser Ala Val Leu Leu Pro Leu Tyr Leu Leu Ser Gly Val
 1 5 10 15

Thr Ser Gly Leu Ala Val Pro Ala Ser Arg Asn Gln Ser Ser Cys Asp
 20 25 30

Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
 35 40 45

Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
 50 55 60

Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
 65 70 75 80

Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Glu Gly Lys Lys Tyr Ser
 85 90 95

Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
 100 105 110

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
 115 120 125

Thr Pro Phe Gly Glu Gln Glu Leu Val Asn Ser Gly Ile Lys Phe Tyr
 130 135 140

Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile Val Pro Phe Ile Arg Ser
 145 150 155 160

Ser Gly Ser Ser Arg Val Ile Ala Ser Gly Lys Lys Phe Ile Glu Gly		
165	170	175
Phe Gln Ser Thr Lys Leu Lys Asp Pro Arg Ala Gln Pro Gly Gln Ser		
180	185	190
Ser Pro Lys Ile Asp Val Val Ile Ser Glu Ala Ser Ser Ser Asn Asn		
195	200	205
Thr Leu Asp Pro Gly Thr Cys Thr Val Phe Glu Asp Ser Glu Leu Ala		
210	215	220
Asp Thr Val Glu Ala Asn Phe Thr Ala Thr Phe Val Pro Ser Ile Arg		
225	230	235 240
Gln Arg Leu Glu Asn Asp Leu Ser Gly Val Thr Leu Thr Asp Thr Glu		
245	250	255
Val Thr Tyr Leu Met Asp Met Cys Ser Phe Asp Thr Ile Ser Thr Ser		
260	265	270
Thr Val Asp Thr Lys Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp		
275	280	285
Glu Trp Ile Asn Tyr Asp Tyr Leu Gln Ser Leu Lys Lys Tyr Tyr Gly		
290	295	300
His Gly Ala Gly Asn Pro Leu Gly Pro Thr Gln Gly Val Gly Tyr Ala		
305	310	315 320
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val His Asp Asp Thr		
325	330	335
Ser Ser Asn His Thr Leu Asp Ser Ser Pro Ala Thr Phe Pro Leu Asn		
340	345	350
Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile		
355	360	365
Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr		
370	375	380
Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr		
385	390	395 400
Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala		
405	410	415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
435 440 445

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
450 455 460

Cys Phe Ala
465

<210> 19
<211> 2665
<212> DNA
<213> *Aspergillus niger*

<400> 19
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gttctgttct tatgatttcc ccacgtcctt tcgggctttc ggcacagcaa aatagattgt 180
ttagcaggta cagaaacaac ttgatgacac atgcatccga gaatcttcag ccgtggaagc 240
attcatgtag atctttgcta agagaaatga tggcggccca gggcatccag gcaccttttc 300
caacggggaa cttccgccgt ccacgtgctc tgattcagcc aatcaagacg tcccacggca 360
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gccttttctct cgagaaagct cctccacttc tcccactaga tatctccgtc cccgtcgact 480
tcccgtccta ttcggcctcg tccgctgaag atccatccca ccattgcacg tgggccacct 540
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ggttatatag gaccgtccgg tccggcgcgga tggccgtagc tgccactcgc tgctgtgcaa 660
gaaattactt ctcataggca tcatgggcgt ctctgctgtt ctacttcctt tgtatctcct 720
gtctgggtat gctaagcacc acaatcaaag tctaataagg accctccctt ccgagggccc 780
ctgaagctcg gactgtgtgg gactactgat cgctgactat ctgtgcagag tcacctccgg 840
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caactacagc ttgggtgcag atgacctgac tcccttcgga gaacaggagc tagtcaactc 1200
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agacagcgaa ttggccgata ccgtcgaagc caatttcacc gccacgttcg tcccctccat 1500
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cctcatggac atgtgctcct tcgacaccat ctccaccagc accgtcgaca ccaagctgtc 1620
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<210> 20

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 20

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			20					25					30		

Thr	Val	Asp	Gln	Gly	Tyr	Gln	Cys	Phe	Ser	Glu	Thr	Ser	His	Leu	Trp
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Gly	Gln	Tyr	Ala	Pro	Phe	Phe	Ser	Leu	Ala	Asn	Glu	Ser	Val	Ile	Ser
	50					55					60				

Pro	Glu	Val	Pro	Ala	Gly	Cys	Arg	Val	Thr	Phe	Ala	Gln	Val	Leu	Ser
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Arg	His	Gly	Ala	Arg	Tyr	Pro	Thr	Asp	Ser	Lys	Gly	Lys	Glu	Tyr	Ser
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Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys
		100					105						110		

Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu
		115					120					125			

Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr	130	135	140	
Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	145	150	155	160
Ser	Gly	Ser	Ser	Arg	Val	Ile	Ala	Ser	Gly	Lys	Lys	Phe	Ile	Glu	Gly	165	170	175	
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Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220	
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Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu	245	250	255	
Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270	
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285	
Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Lys	Lys	Tyr	Tyr	Gly	290	295	300	
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315	320
Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr	325	330	335	
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn	340	345	350	
Ser	Thr	Leu	Tyr	Ala	Asp	Phe	Ser	His	Asp	Asn	Gly	Ile	Ile	Ser	Ile	355	360	365	
Leu	Phe	Ala	Leu	Gly	Leu	Tyr	Asn	Gly	Thr	Lys	Pro	Leu	Ser	Thr	Thr	370	375	380	

Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
 385 390 395 400

Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
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Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
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<210> 21
 <211> 2665
 <212> DNA
 <213> *Aspergillus niger*

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<210> 22

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 22

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Thr Ser Gly Leu Ala Val Pro Ala Ser Arg Asn Gln Ser Ser Cys Asp
          20                      25                      30

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
          35                      40                      45

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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
          50                      55                      60

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Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
          65                      70                      75                      80

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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
          85                      90                      95

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Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys	100	105	110
Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu	115	120	125
Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr	130	135	140
Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	145	150	155
Ser	Gly	Ser	Ser	Arg	Val	Ile	Ala	Ser	Gly	Lys	Lys	Phe	Ile	Glu	Gly	165	170	175
Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser	180	185	190
Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn	195	200	205
Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220
Asp	Thr	Val	Gln	Ala	Asn	Phe	Thr	Ala	Thr	Phe	Val	Pro	Ser	Ile	Arg	225	230	235
Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu	245	250	255
Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285
Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Lys	Lys	Tyr	Tyr	Gly	290	295	300
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315
Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr	325	330	335
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn	340	345	350

Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile
 355 360 365

Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
 370 375 380

Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
 385 390 395 400

Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
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Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
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<210> 23
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 <213> *Aspergillus niger*

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<210> 24

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 24

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
          50                      55                      60

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Arg	His	Gly	Ala	Arg	Tyr	Pro	Thr	Asp	Ser	Lys	Gly	Lys	Lys	Tyr	Ser		
				85					90						95		
Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys		
			100					105						110			
Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu		
		115					120						125				
Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr		
		130				135						140					
Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser		
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Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser		
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			260					265						270			
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp		
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<210> 25

<211> 2665

<212> DNA

<213> *Aspergillus niger*

<400> 25

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<211> 467

<212> PRT

<213> *Aspergillus niger*

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<211> 2665

<212> DNA

<213> *Aspergillus niger*

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<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 28

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Arg	His	Gly	Ala	Arg	Tyr	Pro	Thr	Asp	Ser	Lys	Gly	Lys	Lys	Tyr	Ser
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 <213> Aspergillus niger

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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
 50 55 60

Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
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Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
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Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
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Thr Pro Phe Gly Glu Gln Glu Leu Val Asn Ser Gly Ile Lys Phe Tyr
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Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile Val Pro Phe Ile Arg Ser
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Ser Gly Ser Ser Arg Val Ile Ala Ser Gly Lys Lys Phe Ile Glu Gly
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Phe Gln Ser Thr Lys Leu Lys Asp Pro Arg Ala Gln Pro Gly Gln Ser
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Ser Pro Lys Ile Asp Val Val Ile Ser Glu Ala Ser Ser Ser Asn Asn
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Glu	Gln	Glu	Pro	Leu	Val	Arg	Val	Leu	Val	Asn	Asp	Arg	Val	Val	Pro	420	425	430	
Leu	His	Gly	Cys	Pro	Val	Asp	Ala	Leu	Gly	Arg	Cys	Thr	Arg	Asp	Ser	435	440	445	
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<210> 31
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 <212> DNA
 <213> *Aspergillus niger*

<400> 31

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<210> 32

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<212> PRT

<213> *Aspergillus niger*

<400> 32

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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
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Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
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Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
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Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
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Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile Val Pro Phe Ile Arg Ser
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Ser Gly Ser Ser Arg Val Ile Ala Ser Gly Lys Lys Phe Ile Glu Gly
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Phe Gln Ser Thr Lys Leu Lys Asp Pro Arg Ala Gln Pro Gly Gln Ser
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Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu	245	250	255	
Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270	
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285	
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Ser	Thr	Leu	Tyr	Ala	Asp	Phe	Ser	His	Asp	Asn	Gly	Ile	Ile	Ser	Ile	355	360	365	
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Thr	Val	Glu	Asn	Ile	Thr	Gln	Thr	Asp	Gly	Phe	Ser	Ser	Ala	Trp	Thr	385	390	395	400
Val	Pro	Phe	Ala	Ser	Arg	Leu	Tyr	Val	Glu	Met	Met	Gln	Cys	Gln	Ala	405	410	415	
Glu	Gln	Glu	Pro	Leu	Val	Arg	Val	Leu	Val	Asn	Asp	Arg	Val	Val	Pro	420	425	430	
Leu	His	Gly	Cys	Pro	Val	Asp	Ala	Leu	Gly	Arg	Cys	Thr	Arg	Asp	Ser	435	440	445	

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
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<210> 33
 <211> 2665
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 <213> *Aspergillus niger*

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<210> 34

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 34

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
      50                      55                      60

Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
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Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
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Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
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Thr Pro Phe Gly Glu Gln Glu Leu Val Asn Ser Gly Ile Lys Phe Tyr
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Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile Val Pro Phe Ile Arg Ser
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Thr Leu Asp Pro Gly Thr Cys Thr Val Phe Glu Asp Ser Glu Leu Ala		
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Asp Thr Val Glu Ala Asn Phe Thr Ala Thr Phe Val Pro Ser Ile Arg		
225	230	235 240
Gln Arg Leu Glu Asn Asp Leu Ser Gly Val Thr Leu Thr Asp Thr Glu		
245	250	255
Val Thr Tyr Leu Met Asp Met Cys Ser Phe Asp Thr Ile Ser Thr Ser		
260	265	270
Thr Val Asp Thr Lys Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp		
275	280	285
Glu Trp Ile Asn Tyr Asp Tyr Leu Gln Ser Leu Lys Glu Tyr Tyr Gly		
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His Gly Ala Gly Asn Pro Leu Gly Pro Thr Gln Gly Val Gly Tyr Ala		
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Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val His Asp Asp Thr		
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Ser Ser Asn His Thr Leu Asp Ser Ser Pro Ala Thr Phe Pro Leu Asn		
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Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile		
355	360	365
Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr		
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Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr		
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Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala		
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<210> 35

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<213> *Aspergillus niger*

<400> 35

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<210> 36

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 36

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
      35                      40                      45

Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
      50                      55                      60

Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
      65                      70                      75                      80

Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
      85                      90                      95

Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
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Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
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			180					185					190					
Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn			
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Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala			
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Asp	Thr	Val	Glu	Ala	Asn	Phe	Thr	Ala	Thr	Phe	Val	Pro	Ser	Ile	Arg			
225					230					235					240			
Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu			
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Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser			
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Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp			
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His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala			
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Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr			
				325					330					335				
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn			
			340					345					350					
Ser	Thr	Leu	Tyr	Ala	Asp	Phe	Ser	His	Asp	Asn	Gly	Ile	Ile	Ser	Ile			
		355					360					365						
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	370					375					380							

Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
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Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
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Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
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<210> 37

<211> 2665

<212> DNA

<213> *Aspergillus niger*

<400> 37

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<210> 38

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 38

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
      50              55              60

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Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
      65              70              75              80

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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
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Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	145	150	155
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Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser	180	185	190
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Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220
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Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Asp	Lys	Tyr	Tyr	Gly	290	295	300
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315
Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr	325	330	335
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn	340	345	350

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Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
 370 375 380

Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
 385 390 395 400

Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
 435 440 445

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
 465

<210> 39

<211> 2665

<212> DNA

<213> *Aspergillus niger*

<400> 39

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<210> 40

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 40

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          20                      25                      30

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
          35                      40                      45

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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
          50                      55                      60

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Pro	Glu	Val	Pro	Ala	Gly	Cys	Arg	Val	Thr	Phe	Ala	Gln	Val	Leu	Ser	65	70	75	80
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Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys	100	105	110	
Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu	115	120	125	
Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr	130	135	140	
Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	145	150	155	160
Ser	Gly	Ser	Ser	Arg	Val	Ile	Ala	Ser	Gly	Lys	Lys	Phe	Ile	Glu	Gly	165	170	175	
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Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn	195	200	205	
Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220	
Asp	Thr	Val	Lys	Ala	Asn	Phe	Thr	Ala	Thr	Phe	Val	Pro	Ser	Ile	Arg	225	230	235	240
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Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Arg	Lys	Tyr	Tyr	Gly	290	295	300	
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315	320

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 Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
 385 390 395 400
 Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
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 Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430
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<210> 41

<211> 2665

<212> DNA

<213> *Aspergillus niger*

<400> 41

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2665

<210> 42

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 42

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Pro	Glu	Val	Pro	Ala	Gly	Cys	Arg	Val	Thr	Phe	Ala	Gln	Val	Leu	Ser
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Arg	His	Gly	Ala	Arg	Tyr	Pro	Thr	Asp	Ser	Lys	Gly	Lys	Glu	Tyr	Ser
				85					90					95	
Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys
			100					105					110		
Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu
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<213> *Aspergillus niger*

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<213> *Aspergillus niger*

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<213> *Aspergillus niger*

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 <213> *Aspergillus niger*

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<213> *Aspergillus niger*

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Pro	Glu	Val	Pro	Ala	Gly	Cys	Arg	Val	Thr	Phe	Ala	Gln	Val	Leu	Ser
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Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser
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Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn	195	200	205	
Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220	
Asp	Thr	Val	Lys	Ala	Asn	Phe	Thr	Ala	Thr	Phe	Val	Pro	Ser	Ile	Arg	225	230	235	240
Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu	245	250	255	
Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270	
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285	
Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Asp	Glu	Tyr	Tyr	Gly	290	295	300	
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315	320
Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr	325	330	335	
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn	340	345	350	
Ser	Thr	Leu	Tyr	Ala	Asp	Phe	Ser	His	Asp	Asn	Gly	Ile	Ile	Ser	Ile	355	360	365	
Leu	Phe	Ala	Leu	Gly	Leu	Tyr	Asn	Gly	Thr	Lys	Pro	Leu	Ser	Thr	Thr	370	375	380	
Thr	Val	Glu	Asn	Ile	Thr	Gln	Thr	Asp	Gly	Phe	Ser	Ser	Ala	Trp	Thr	385	390	395	400
Val	Pro	Phe	Ala	Ser	Arg	Leu	Tyr	Val	Glu	Met	Met	Gln	Cys	Gln	Ala	405	410	415	
Glu	Gln	Glu	Pro	Leu	Val	Arg	Val	Leu	Val	Asn	Asp	Arg	Val	Val	Pro	420	425	430	
Leu	His	Gly	Cys	Pro	Val	Asp	Ala	Leu	Gly	Arg	Cys	Thr	Arg	Asp	Ser	435	440	445	

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
 465

<210> 49
 <211> 2665
 <212> DNA
 <213> *Aspergillus niger*

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<210> 50

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 50

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Met Gly Val Ser Ala Val Leu Leu Pro Leu Tyr Leu Leu Ser Gly Val
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Thr Ser Gly Leu Ala Val Pro Ala Ser Arg Asn Gln Ser Ser Cys Asp
          20                      25                      30

```

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
          35                      40                      45

```

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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
  50                      55                      60

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Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Glu Tyr Ser
          85                      90                      95

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Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
          100                      105                      110

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Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
          115                      120                      125

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Thr Pro Phe Gly Glu Gln Glu Leu Val Asn Ser Gly Ile Lys Phe Tyr
          130                      135                      140

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Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile Val Pro Phe Ile Arg Ser
          145                      150                      155                      160

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 180 185 190
 Ser Pro Lys Ile Asp Val Val Ile Ser Glu Ala Ser Ser Ser Asn Asn
 195 200 205
 Thr Leu Asp Pro Gly Thr Cys Thr Val Phe Glu Asp Ser Glu Leu Ala
 210 215 220
 Asp Thr Val Glu Ala Asn Phe Thr Ala Thr Phe Val Pro Ser Ile Arg
 225 230 235 240
 Gln Arg Leu Glu Asn Asp Leu Ser Gly Val Thr Leu Thr Asp Thr Glu
 245 250 255
 Val Thr Tyr Leu Met Asp Met Cys Ser Phe Asp Thr Ile Ser Thr Ser
 260 265 270
 Thr Val Asp Thr Lys Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
 275 280 285
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 290 295 300
 His Gly Ala Gly Asn Pro Leu Gly Pro Thr Gln Gly Val Gly Tyr Ala
 305 310 315 320
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 325 330 335
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 340 345 350
 Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile
 355 360 365
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 370 375 380
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 385 390 395 400
 Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
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Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
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<210> 51

<211> 2665

<212> DNA

<213> *Aspergillus niger*

<400> 51

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<210> 52

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 52

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Thr Ser Gly Leu Ala Val Pro Ala Ser Arg Asn Gln Ser Ser Cys Asp
      20                      25                      30

Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
      35                      40                      45

Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
      50                      55                      60

Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
      65                      70                      75                      80

Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Glu Tyr Ser
      85                      90                      95

Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala Thr Thr Phe Asp Gly Lys
      100                      105                      110

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser Leu Gly Ala Asp Asp Leu
      115                      120                      125

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Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr	130	135	140	
Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	145	150	155	160
Ser	Gly	Ser	Ser	Arg	Val	Ile	Ala	Ser	Gly	Lys	Lys	Phe	Ile	Glu	Gly	165	170	175	
Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser	180	185	190	
Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn	195	200	205	
Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220	
Asp	Thr	Val	Lys	Ala	Asn	Phe	Thr	Ala	Thr	Phe	Val	Pro	Ser	Ile	Arg	225	230	235	240
Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu	245	250	255	
Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270	
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285	
Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Lys	Glu	Tyr	Tyr	Gly	290	295	300	
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315	320
Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr	325	330	335	
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn	340	345	350	
Ser	Thr	Leu	Tyr	Ala	Asp	Phe	Ser	His	Asp	Asn	Gly	Ile	Ile	Ser	Ile	355	360	365	
Leu	Phe	Ala	Leu	Gly	Leu	Tyr	Asn	Gly	Thr	Lys	Pro	Leu	Ser	Thr	Thr	370	375	380	

Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
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Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
 435 440 445

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
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Cys Phe Ala
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<210> 53
 <211> 2665
 <212> DNA
 <213> *Aspergillus niger*

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<210> 54

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 54

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Met Gly Val Ser Ala Val Leu Leu Pro Leu Tyr Leu Leu Ser Gly Val
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Thr Ser Gly Leu Ala Val Pro Ala Ser Arg Asn Gln Ser Ser Cys Asp
      20                      25                      30

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
      35                      40                      45

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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
      50                      55                      60

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Pro Glu Val Pro Ala Gly Cys Arg Val Thr Phe Ala Gln Val Leu Ser
      65                      70                      75                      80

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Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Ala Gly Lys Lys Tyr Ser
      85                      90                      95

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Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys	100	105	110
Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu	115	120	125
Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr	130	135	140
Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	145	150	155 160
Ser	Gly	Ser	Ser	Arg	Val	Ile	Ala	Ser	Gly	Lys	Lys	Phe	Ile	Glu	Gly	165	170	175
Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser	180	185	190
Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn	195	200	205
Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220
Asp	Thr	Val	Gln	Ala	Asn	Phe	Thr	Ala	Thr	Phe	Val	Pro	Ser	Ile	Arg	225	230	235 240
Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu	245	250	255
Val	Thr	Tyr	Leu	Met	Asp	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285
Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Glu	Lys	Tyr	Tyr	Gly	290	295	300
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315 320
Asn	Glu	Leu	Ile	Ala	Arg	Leu	Thr	His	Ser	Pro	Val	His	Asp	Asp	Thr	325	330	335
Ser	Ser	Asn	His	Thr	Leu	Asp	Ser	Ser	Pro	Ala	Thr	Phe	Pro	Leu	Asn	340	345	350

Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile
 355 360 365

Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
 370 375 380

Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
 385 390 395 400

Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415

Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430

Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
 435 440 445

Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
 450 455 460

Cys Phe Ala
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<210> 55

<211> 2665

<212> DNA

<213> *Aspergillus niger*

<400> 55

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 gttctgttct tatgatttcc ccacgtcctt tccgggctttc ggacacagcaa aatagattgt 180
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<210> 56

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 56

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Thr Ser Gly Leu Ala Val Pro Ala Ser Arg Asn Gln Ser Ser Cys Asp
      20                      25                      30

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Thr Val Asp Gln Gly Tyr Gln Cys Phe Ser Glu Thr Ser His Leu Trp
      35                      40                      45

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Gly Gln Tyr Ala Pro Phe Phe Ser Leu Ala Asn Glu Ser Val Ile Ser
      50                      55                      60

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Arg	His	Gly	Ala	Arg	Tyr	Pro	Thr	Asp	Ser	Lys	Gly	Lys	Ala	Tyr	Ser	85	90	95	
Ala	Leu	Ile	Glu	Glu	Ile	Gln	Gln	Asn	Ala	Thr	Thr	Phe	Asp	Gly	Lys	100	105	110	
Tyr	Ala	Phe	Leu	Lys	Thr	Tyr	Asn	Tyr	Ser	Leu	Gly	Ala	Asp	Asp	Leu	115	120	125	
Thr	Pro	Phe	Gly	Glu	Gln	Glu	Leu	Val	Asn	Ser	Gly	Ile	Lys	Phe	Tyr	130	135	140	
Gln	Arg	Tyr	Glu	Ser	Leu	Thr	Arg	Asn	Ile	Val	Pro	Phe	Ile	Arg	Ser	145	150	155	160
Ser	Gly	Ser	Ser	Arg	Val	Ile	Ala	Ser	Gly	Lys	Lys	Phe	Ile	Glu	Gly	165	170	175	
Phe	Gln	Ser	Thr	Lys	Leu	Lys	Asp	Pro	Arg	Ala	Gln	Pro	Gly	Gln	Ser	180	185	190	
Ser	Pro	Lys	Ile	Asp	Val	Val	Ile	Ser	Glu	Ala	Ser	Ser	Ser	Asn	Asn	195	200	205	
Thr	Leu	Asp	Pro	Gly	Thr	Cys	Thr	Val	Phe	Glu	Asp	Ser	Glu	Leu	Ala	210	215	220	
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Gln	Arg	Leu	Glu	Asn	Asp	Leu	Ser	Gly	Val	Thr	Leu	Thr	Asp	Thr	Glu	245	250	255	
Val	Thr	Tyr	Leu	Met	Ala	Met	Cys	Ser	Phe	Asp	Thr	Ile	Ser	Thr	Ser	260	265	270	
Thr	Val	Asp	Thr	Lys	Leu	Ser	Pro	Phe	Cys	Asp	Leu	Phe	Thr	His	Asp	275	280	285	
Glu	Trp	Ile	Asn	Tyr	Asp	Tyr	Leu	Gln	Ser	Leu	Asp	Lys	Tyr	Tyr	Gly	290	295	300	
His	Gly	Ala	Gly	Asn	Pro	Leu	Gly	Pro	Thr	Gln	Gly	Val	Gly	Tyr	Ala	305	310	315	320

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val His Asp Asp Thr
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 Ser Ser Asn His Thr Leu Asp Ser Ser Pro Ala Thr Phe Pro Leu Asn
 340 345 350
 Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile
 355 360 365
 Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
 370 375 380
 Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr
 385 390 395 400
 Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala
 405 410 415
 Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
 420 425 430
 Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser
 435 440 445
 Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu
 450 455 460
 Cys Phe Ala
 465

<210> 57
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide for generating site-specific
 insertions

<400> 57
 ctttgggggtc tatacgacc g

21

<210> 58
 <211> 21
 <212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Oligonucleotide for generating site-specific
insertions

<400> 58

ctttggggtc catacgacc g

21

<210> 59

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Oligonucleotide for generating site-specific
insertions

<400> 59

cacgacaaca gcctggtttc catcttc

27

<210> 60

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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<210> 61

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 61

acatctagac taaagcactc tcc

23

<210> 62
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide for generating site-specific
insertions

<400> 62
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25

<210> 63
<211> 27
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<213> Artificial Sequence

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<223> Description of Artificial Sequence:
Oligonucleotide for generating site-specific
insertions

<400> 63
ctccagtcct tggataagta ttacggc

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<210> 64
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide for generating site-specific
insertions

<400> 64
ctccagtcct tgagaaagta ttacggc

27

<210> 65
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide for generating site-specific
 insertions

<400> 65
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<210> 66
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 66
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<210> 67
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 67
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<210> 68
 <211> 2665
 <212> DNA
 <213> *Aspergillus niger*

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 ttagcaggta cagaaacaac ttgatgacac atgcatccga gaatcttcag ccgtggaagc 240
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<210> 69

<211> 467

<212> PRT

<213> *Aspergillus niger*

<400> 69

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Thr	Ser	Gly	Leu	Ala	Val	Pro	Ala	Ser	Arg	Asn	Gln	Ser	Ser	Cys	Asp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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His Gly Ala Gly Asn Pro Leu Gly Pro Thr Gln Gly Val Gly Tyr Ala				
305		310		315 320
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val His Asp Asp Thr				
	325		330	335
Ser Ser Asn His Thr Leu Asp Ser Ser Pro Ala Thr Phe Pro Leu Asn				
	340		345	350
Ser Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile				
	355		360	365
Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr				
	370		375	380
Thr Val Glu Asn Ile Thr Gln Thr Asp Gly Phe Ser Ser Ala Trp Thr				
385		390		395 400
Val Pro Phe Ala Ser Arg Leu Tyr Val Glu Met Met Gln Cys Gln Ala				
	405		410	415
Glu Gln Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro				
	420		425	430
Leu His Gly Cys Pro Val Asp Ala Leu Gly Arg Cys Thr Arg Asp Ser				
	435		440	445
Phe Val Arg Gly Leu Ser Phe Ala Arg Ser Gly Gly Asp Trp Ala Glu				
	450		455	460
Cys Phe Ala				
465				